DOCUMENT RESUME

ED 480 436 CE 085 410

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|---|---|
| TITLE | Women and Technical Professions. Leonardo da Vinci Series: Good Practices. |
| INSTITUTION | Commission of the European Communities, Brussels (Belgium). Directorate-General for Education and Culture. |
| REPORT NO | NC-41-01-050-EN-C; No-1 |
| ISBN | ISBN-92-894-1863-X |
| PUB DATE | 2002-00-00 |
| NOTE | 16p.; Also available in French, German, Italian and Spanish. |
| AVAILABLE FROM | For full text: http://europa.eu.int/comm/dgs/education_culture/publ/pdf/leo1/en.pdf. |
| PUB TYPE | Information Analyses (070) |
| EDRS PRICE | EDRS Price MF01/PC01 Plus Postage. |
| DESCRIPTORS | Access to Education; Career Choice; Career Guidance; Educational Opportunities; *Educational Practices; Elementary Secondary Education; Employment Opportunities; Entrepreneurship; Equal Opportunities (Jobs); Foreign Countries; Males; *Nontraditional Occupations; Postsecondary Education; Rural Education; Sex Differences; Sex Fairness; Sex Stereotypes; *Technical Education; *Womens Education; *Work Experience Programs |
| IDENTIFIERS | *Best Practices; *European Union |

ABSTRACT

This document profiles programs for women in technical professions that are offered through the European Commission's Leonardo da Vinci program. The following programs are profiled: (1) Artemis and Diana (vocational guidance programs to help direct girls toward technology-related careers); (2) CEEWIT (an Internet-based information and communication technologies program for women in rural Ireland); (3) CuWat (a project to introduce the concept of equal opportunities for women and women into scientific curricula); (4) improving the employability of girls and women; (5) E-Qual (a project to facilitate women's access to new professions in ecological technologies); (6) women and information technology (an analysis that identified differences between men and women in access to and use of new technologies); (7) JASS (a project to motivate women with scientific or technical training to start their own business); (8) WITEC (a training module to improve women's employability in traditionally male sectors); (9) WOMEC (orientation courses for women in the building, metallurgy, and electrical engineering sectors); (10) WOQUATEWO (a project to improve women's skills in new technologies); and (11) WOTEC (a project to combat stereotypes about women in technical professions. Each program description includes an overview of the program's goals and practices and the name and address of at least one contact person. (MN)

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Directorate-General for Education and Culture

## Leonardo da Vinci

*Series: Good Practices* (1)

# Women and technical professions

European Commission

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Knowledge and professional skills must be regularly updated if we are to address the new requirements of the economy and the labour market. Now, more than ever before, lifelong learning is essential for all. The Leonardo da Vinci programme, which has been the chief Community instrument in the field of vocational training since 1995, provides concrete responses to these new needs.

The results of the projects supported under this programme deserve to be more widely disseminated among the vocational training community, the social partners, and policy makers. Subsequently they must be adapted to other target groups, developed, used in other professional environments, and introduced into the national systems.

To this end the Education and Culture DG, which manages the Leonardo da Vinci programme, has prepared a series of brochures 'Leonardo da Vinci – Good Practices', to inform people about the results of the programme. These brochures are designed to familiarise as many people as possible with examples of good practices under the programme. The projects presented here have been selected for their impact and their originality. This selection represents only a small sample of what the programme has achieved between 1995 and 1999. It is with great pleasure that I present this brochure by the Education and Culture DG which, I hope, you will find interesting.

Viviane Reding
Member of the European Commission
responsible for education and culture

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# Women and technical professions

Access of women to the technical professions is still very restricted. While equality between men and women in access to vocational training is enshrined in Community texts [1], the fact remains that scientific and technical careers are still a male preserve.

The main reasons for this gap are stereotypes which all too often further narrow women's educational and training choices. Certain prejudices are anchored in the family and in society and surface when girls choose what they want to study. Parents or teachers often advise girls against choosing an overly technical career, which would lead to traditionally male jobs where women are not yet fully accepted. For their part, women do not always have confidence in their own capacity to make an unconventional choice. Hence vocational training plays a crucial role in bringing about equal opportunities, which begin at the home and continue at school, at the level of students, teachers and vocational counsellors.

One of the goals of the Leonardo da Vinci programme is to promote equal opportunities for men and women. In the programme's first phase (1995–99), several projects addressed equal opportunities in accessing traditionally male-dominated training and occupations. The purpose of these projects was to remove the socio-cultural barriers which often underpin prejudices that affect women's career choices. The projects concerned the role of vocational training in unconventional career choices, the design of technical training modules targeted at women, and the sensitisation of instructors to equal opportunities.

On the whole these projects have had good results. In several cases they have contributed to developing vocational training practices and to sensitising players at grass roots level to the need to ensure a better gender balance in education and at work.

This brochure presents several good practices and experiences from among the most important of those identified in these projects. They should be fleshed out and adapted to the requirements of lifelong learning in a society which is increasingly based on knowledge.

For further information on the Leonardo da Vinci programme and to consult the electronic version of this brochure:
http://europa.eu.int/comm/education/leonardo/leonardo2_en.html

or you can write to the following address:

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(1)
*Memorandum on lifelong learning; Community framework strategy in the field of equality between women and men (2001-2005).*
The Stockholm European Council (March 2001) thus recalled in its conclusions the need to encourage women to take up scientific and technical careers.



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# ARTEMIS and DIANA

**Equal opportunities must begin with vocational guidance at a time when young people and in particular girls make their career choices.**

Young women are still too often directed towards traditionally female jobs, which do not require specialised vocational training and which, in certain European countries, belong to declining economic sectors. The objective of the promoter of these two Leonardo da Vinci projects, the Greek training and vocational organisation IEKEP, was to promote equal career opportunities by encouraging women to enter sectors in which they are underrepresented, notably the more technical fields. This mainstreaming action was implemented both at the level of students and vocational counsellors. Young women had to be encouraged to follow their professional interests; instructors had to be sensitised to the problem of prejudices in the field of career guidance.

Artemis (1995) has developed an electronic vocational guidance tool which describes the profiles of 24 women who succeeded professionally in the rather untypical careers of mechanic, technician, computer expert, electrician, head of marketing and production, etc. This material is accompanied by a specific guide intended for vocational counsellors. The results of the Artemis project were fleshed out in the Diana project (1997), which produced two training and sensitisation modules targeted at secondary school girls (aged 13 to 18) in English and Greek. These courses are of excellent quality and are very user-friendly. They are supplemented by a training module for vocational counsellors designed to sensitise them to the need to combat certain stereotypes in the exercise of their profession so as to make equal opportunities a reality. The Diana modules have been adopted by the Greek education system and are part of the national curriculum. They are used on a regular basis. The results of Artemis were later disseminated in another Leonardo project of 1999, Womancareer.

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# CEEWIT

**Familiarity with the new information and communication technologies is essential for the vocational integration of women today, in particular for women who live in geographically-isolated areas.**

The Irish CEEWIT project is addressed in particular to countrywomen, who are often isolated and hence have difficulties in accessing vocational training and the labour market. Because of rapid technological change, continuous training and familiarity with the Internet is indispensable. However, the Internet is still a rarity in certain more disadvantaged rural regions, and chiefly among women in these regions.

In 1998, to address these needs, the CEEWIT project developed a high-quality on-line Internet training tool, mainly intended for countrywomen. This is a self-training tool on the use of the Internet which is straightforward and user-friendly. It is adapted to the specific needs of countrywomen and the need to reconcile family and working life, and it also takes into account their difficulties in travelling to attend training courses. The CEEWIT methodology on which the course is based is also very interesting. Students can train themselves independently with the help of a distance tutor. Self-training is, however, combined with teamwork. The students are strongly advised to interact, to exchange views and to work out solutions to common problems. The course consists of 13 linear models: each session is independent of the others and can be used at any time during the training.

The courses were successfully tested in the four partner countries (Ireland, Norway, Iceland, Slovakia) between October 1999 and December 2000. The training module is available on the Internet in English. Versions in the other three partner languages are also accessible. The partnership recently obtained the authorisation to commercialise the project results from the European Commission.

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# CUWAT

**A project designed to introduce the concept of equal opportunities for women and men into the basic structure of the scientific curricula**

Vocational training courses in technical and scientific fields are generally structured on the basis of a curriculum which traditionally has not been attractive to women. The promoter, the Norwegian Engineers' Association, has developed this Leonardo da Vinci project with a view firstly to addressing the causes of the low rate of female participation in technological training and, ultimately, to proposing solutions.

In order to improve women's job prospects and to facilitate their access to traditionally male professions, the partners (Norway, Germany, United Kingdom, Netherlands, Denmark, Greece, Sweden) considered it essential to alter the pedagogic approach in scientific training courses. The curriculum developed in the CuWat project was inspired by the real needs of the industry and engineering community. Today there is a brisk demand for scientific profiles which combine technical competence with skills which are traditionally neglected in training courses: flexibility, adaptability, self-confidence, social skills, communication skills, creativity, language skills, ability to retool rapidly, teamwork skills, and the ability to address and resolve unforeseen problems. It has been shown that women are generally predisposed towards these meta-competences which, in the course of a successful career, are just as important as technical skills. Scientific curricula which include these skills may be more attractive for women.

The CuWat approach has been proposed to several universities and scientific and technical institutes in the partner countries. The basic principles of the curriculum have been introduced into certain training courses. The Engineering Faculty of the University of Aalborg has completely overhauled its courses on the basis of the CuWat curriculum, in order to attract more women to its scientific training courses and to make the most of women's hidden skills. The curriculum has been widely disseminated and has been presented at several scientific conferences.

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# Improving the employability of girls and women

**A training project for teachers to sensitise schools to the importance of the access of women to technical professions**

The employability of girls starts at school. It is at school that girls' professional aspirations must be supported by their teachers. However, the reality is often quite the opposite: families and teachers advise young women against pursuing an overly technical career.

The project mounted by ORFE – a French training and vocational guidance organisation – was designed to sensitise the personnel of training institutes to the technical training of women, by offering opportunities for cooperating with firms in facilitating the vocational integration of women.

In 1995, in cooperation with several European partners (Austria, Denmark, the United Kingdom and the Netherlands), this Leonardo da Vinci project prepared a trilingual training module (FR, EN, DE) intended for teachers and consisting of four parts:

- sensitisation to the problem of women and technology;
- sensitisation to the role of teachers and their capacity to bring about change;
- enhancing teachers' social skills;
- working together with firms.

The module includes a series of stimulating teaching tools in the field of verbal and non-verbal communication (theatre workshops, video of symposiums with firms on the employability of women in technical professions) for classroom use. The project has also created a CD-ROM focusing on the problem of 'women and technology' and a manual containing examples of the employability of women in 12 firms in the technical sector.

The module has been widely circulated in teacher training institutes. Company awareness-raising symposiums were organised in the course of the project. Six years on, the module is still quite widespread and popular in France. The French Ministry of Education is currently reproducing 400 copies of the CD-ROM for distribution to vocational counsellors. The project has had a major impact chiefly at regional but also at European level: the results were used as the basis for mounting a NOW initiative in the United Kingdom under the structural funds.

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# E-QUAL

**A project to facilitate access of women to new professions in the field of ecological techniques**

The E-Qual project was developed by the German Centre for Training in Ecological Techniques LIFE, in partnership with the United Kingdom, the Netherlands and Denmark. E-Qual takes as its point of departure the fact that far too few women participate in training measures or have found jobs in a technical profession at European level. Besides, vocational training devotes far too little attention to environmental protection. In order to bridge these gaps, E-Qual developed four initial vocational training modules in German and in English intended for women in the following sectors:

- Energy and the environment;
- Solar energy;
- Photovoltaic systems: introduction;
- Photovoltaic systems: application.

The E-Qual project has had quite impressive results in the partner countries. Up to now the training modules have been used by over 200 women, chiefly because they use a clear and simple language suited to beginners. In the Netherlands the modules have had a direct impact on vocational training in the electrotechnical field, in particular as regards the content of the training. Czech versions of the modules are currently in preparation. The E-Qual project was also the starting point for several Leonardo projects which later fleshed out the initial project. The modules are regularly updated and adapted by the promoter who, thanks to the Leonardo experience, cooperates closely with several schools, training institutes and networks whose mission is to promote women in non-traditional professions and notably to integrate environmental questions into vocational training.

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# Women and information technology

**An analysis which identifies the differences between women and men in access to and the use of new technologies. A project to help women familiarise themselves with the information society and to improve their job prospects during a period of rapid technological change.**

Several studies on women and information technology have shown that women are underrepresented in this professional sector and have highlighted the gap between IT and the world of women. Women are not particularly enthusiastic about using computers outside the workplace. In schools, when technological innovations are introduced, schoolgirls do not generally make the first step.

In 1996, in the light of these findings, this Leonardo project conducted a study of the situation of women as regards technological innovation in the three partner countries – Italy, France and the United Kingdom. The survey results are also presented in a film on the topic of continuous training which demonstrates how the problem of the difference between men and women as regards technological innovation is perceived. It consists of a series of interviews filmed during evening courses, in self-training and in working class areas with the various players involved in vocational training: instructors, teachers, women users. All the results of the project can be consulted on the Internet in English and Italian.

Certain findings are particularly striking. The obstacles facing women as regards access to information technology are still strongly bound up with the influence of society and the family on women's career choices. Women begin to use computers at least one year later than men. In the great majority of cases they access computers at work or during their studies: the fact that women lack the time for a more game-oriented learning process works against them. Often, lack of confidence is the first barrier to using computers. Women are more diffident than their male colleagues, but the study also shows that they are more methodological and determined once the initial obstacles have been overcome.

The project promoter, the Italian firm Ticonuno, has mounted a vast campaign to disseminate the survey results, mainly in Italy. The products of the project 'Women and information technology' have been presented at conferences on the new technologies in the Italian universities and are used in various computer courses financed under the European Social Fund (ESF), in which Ticonuno participates in its capacity as a training company.

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# JASS

**Motivate women with a scientific or technical training to set up their own business: a strategy development and analysis project**

The promoter, ComEAST, is a regional organisation created in the framework of the Comett programme and serves as a contact point for the world of education and the business community. It developed this Leonardo da Vinci project in 1997 after first surveying local needs. In the new German Lander many women have had an excellent scientific training but very often lack the courage to start an independent career and set up their own business. For example, in 1998 only 22% of firms in Sachsen-Anhalt were created by women. The purpose of the projects is to compare the situation with other European regions and to develop training tools for women who want to start an independent career.

The project promoter has performed analyses and empirical surveys in the partner countries (Germany, Belgium, Spain, Netherlands, Sweden and the United Kingdom) with businesswomen, female students and female participants in dedicated business creation training courses in order to identify the training needs and attitudes of women with a scientific and technical training as regards business creation.

The results of the analysis were used as a basis for developing three training modules focusing on the specific needs of aspiring women entrepreneurs. The modules concern business creation, business management, business strategy, and the training of future women entreprenеurs.

The modules are available in German and English and are intended both for unemployed women and for women returners. The project was developed in the framework of the WITEC network (see specific file).

Currently, the JASS modules are part of the business creation programme (supported by the European Social Fund) of the Ministry of Employment of Sachsen-Anhalt, which is also a partner in the project. The modules are used in vocational training courses both for women and also for men. The JASS project results will shortly be the subject of a workshop on vocational training organised by the German Ministries for the Economy and Education.

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# WITEC – science, engineering and technology

**A training module designed to improve the employability of women in traditionally male sectors in full expansion**

The European network 'Women in science, engineering and technology' – WITEC, which was created in 1988 with the support of the European programme Comett, has for several years been developing a raft of activities designed to improve the employability of women in the sectors of science, engineering and technology. This Leonardo project was designed in 1995 and implemented by the WITEC network in order to develop IT training modules tailored to the needs and interests of women who are seeking employment in these areas.

The project has produced six short-term training courses (4-5 days each) addressed to the different target groups: women with technical qualifications, aspiring female entrepreneurs, female instructors, and female vocational counsellors. The courses concern various subjects such as IT updating for women returners; flexible working; basic multimedia courses for women; the business potential of the Internet, etc. The six modules are supplemented by a mentor's guide. The courses were tested by different members of the network (involving 12 European countries) and were deemed to be a resounding success by the target public. A major campaign to disseminate the results of the project to various training centres was mounted in parallel. The project has highlighted the gap between men and women as regards the use of new technologies and the need to continue developing support activities.

This project supplements the WITEC network activities and is linked to other Leonardo da Vinci projects in the same area: the JASS project (see specific file) and the WWW Resource Centre for Women in SET, an Internet-based interactive resource centre which provides valuable information on courses and career openings for women in the fields of science, engineering and technology.

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# WOMEC

**Women in industry: orientation courses for women in the building, metallurgy and electrical engineering sectors**

The goal of the WOMEC project (1998) was to develop theoretical and practical training modules in such sectors as building, metallurgy and electricity, which traditionally have been relatively inaccessible for women. The objective was to familiarise women with these professions, to encourage them to opt for technical careers and hence to improve their employment prospects.

The promoter, the Finnish training institute Adulta, in cooperation with the partner countries – the Netherlands, Ireland and the Czech Republic – have developed three training modules in the abovementioned sectors. The courses are chiefly intended for women, but they are also open to men. The products are available in paper format, on CD-ROM and on the Internet.

The project's pilot phase was a resounding success, given that WOMEC's goal was to provide vocational guidance in highly technical sectors: 23 out of 26 students obtained the final certificate and continued their technical careers. Some have found jobs in the sectors concerned, whereas others have continued their training. Only two of them were still unemployed in 2000.

The WOMEC modules have now become permanent training courses in the partner countries. Besides, negotiations are currently underway with the Czech Ministry for Education for the recognition of the WOMEC courses in the Czech Republic's national education system.

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# WOQUATEWO

**The acquisition of new skills in the field of telecommunications and information technologies is central to the new forms of work organisation. Hence possession of such skills is crucial for the integration of women into the life of the firm.**

Globalisation has compelled companies to modify their production, management and work organisation systems, but very often women are not involved in this process of internal restructuring. This 1996 Leonardo da Vinci project was designed to improve women's skills in the field of the new technologies with a view to helping them to adapt to new forms of work and to participate more actively in reorganising the firms in which they are employed.

The promoter, the German institute 'Arbeit und Technik' (Work and Technology), in cooperation with the partner countries – Denmark, United Kingdom and Italy – first carried out a study in 40 European firms on women's IT skill requirements in the framework of the new working structures. The national reports based on this analysis were then used as a basis for preparing a distance continuous training module in the multimedia sector, targeted at women.

The Woquatewo project has published a methodological guide for analysing company training needs. This tool is intended for human resource managers and heads of training in small and medium-sized undertakings. The guide is available in English and German and can be used to analyse the training needs of both women and men. The project also developed a training module for women on 'Work planning for women in industrial production', in conjunction with a set of exercises. This is a computer-assisted training module which can be used at the workplace and is available in German and Italian.

The Woquatewo project has been widely disseminated in the partner countries. Firms in Germany, Italy and Denmark are currently using both the guide and the module for training their staff.

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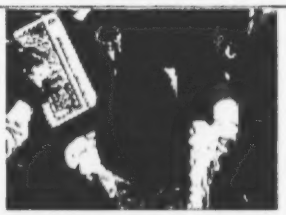
# WOTEC: technology is for women

**Raising awareness about equal opportunities begins at school and in the home. It is in these two environments that WOTEC strives to combat stereotypes about women in the technical professions.**

The project was created in 1997 out of the awareness that women are still greatly underrepresented in highly qualified and well-paid jobs with a high technological content. Notably, in the three countries involved in the project (Italy, France, Greece), the proportion of highly-qualified female technicians is very small, mainly because they choose other specialisations: vocational training schools and technical colleges are rarely frequented by girls. Even when they do receive training of this kind, girls seem to be disadvantaged because of received ideas as to the respective roles of men and women in society. These stereotypes, which are profoundly anchored in mentalities, both at home and in schools, reinforce a false image of women as incapable of working in technical trades.

WOTEC has organised interesting discussions and information work amongst female students, women teachers and schoolgirls' mothers concerning equal opportunities for men and women in education and access to the technical professions. The project's pedagogic approach was to promote teamwork in mixed workshops (schoolgirls, teachers and parents). The purpose of the workshops was to initiate young schoolgirls (starting at the kindergarten!) in manual and technical work and to propose new forms of training in vocational and technical schools. The project has thus raised awareness on the part of teachers, technicians and parents as to the needs and difficulties encountered by girls who opt for a technical career.

The 'worksheets' and a CD-ROM resulting from the career pathways which were analysed and inventoried describe the work done by each of the schools involved in the project. The style is accessible and readers are invited to address the problem of gender stereotypes. Currently, the promoter is setting up an association for the dissemination and future development of the WOTEC results. The worksheets have already been distributed in several schools and regions in the participating countries with the long-term goal of adapting vocational guidance practices so as to encourage women in their career choices.



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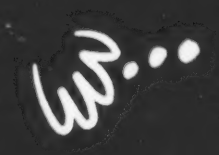

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It can be accessed through the Europa server (http://europa.eu.int).

Luxembourg: Office for Official Publications of the European Communities, 2002

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ISBN 92-894-1863-X

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